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COMPLETED

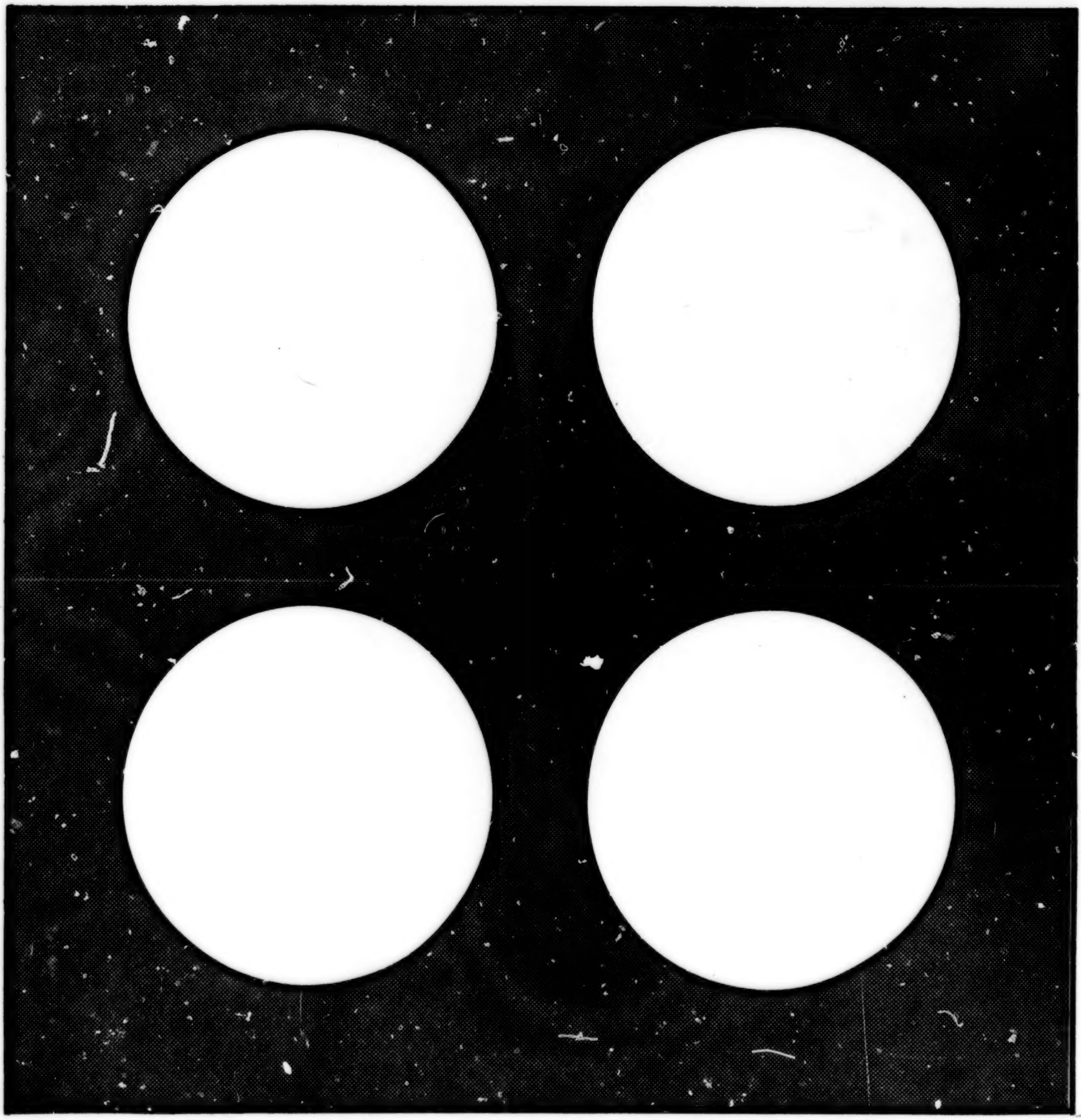
RESEARCH IN SCIENCE EDUCATION (RISE)

ORIGINAL

Guide for the Preparation of Formal Proposals

APPLY TO:

National Science Foundation
Directorate for Science Education
Division of Science Education
Development and Research
Washington, D.C. 20550



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SPECIAL NOTE

SPECIAL ACTIVITIES RELATED TO SCIENCE EDUCATION DEVELOPMENT AND RESEARCH

The Division of Science Education Development and Research (SEDR) supports a variety of research and development activities designed to strengthen the Nation's system of science education. From time to time, however, proposals or inquiries are received about potential projects that do not fully meet the requirements established for existing programs, or, in some cases, overlap programs.

The Division will entertain such proposals if the project put forward meets the following conditions:

1. relates to the broad objectives of the Division;
2. falls outside the guidelines of existing programs of the Directorate for Science Education, including the Research in Science Education and Development in Science Education programs, see SE 79-1, Guide to Science Education Programs or NSF 78-45, Guide to Programs Fiscal Year 1979; and
3. shows promise of providing information and experience useful in improving the effectiveness of existing programs of the Science Education Directorate or in designing new ones for the future.

Proposals meeting these criteria will be considered individually and may be submitted at any time. Prospective applicants should establish initial contact by a brief letter of inquiry that describes the intended project. Address such letters to either the Research in Science Education Program or the Development in Science Education Program, care of:

Division of Science Education Development
and Research
National Science Foundation
Washington, D.C. 20550

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Preliminary Proposals

Prospective applicants should plan to submit a proposal in preliminary form as a basis for discussion *before* a formal proposal is prepared (see Appendix F).

I. PURPOSE OF THE PROGRAM

The Research in Science Education (RISE) Program seeks to assist in creating and organizing a body of fundamental knowledge that can be used to improve the quality and effectiveness of science education for a wide spectrum of consumers. For this reason the RISE Program of the National Science Foundation provides support for research that might ultimately lead to the improvement of the quality of science and mathematics education. The focus of RISE this year will fall primarily in five areas of current concern.

1. SCIENCE EDUCATION FOR THE EARLY ADOLESCENT

For many students the last opportunity to learn science in school occurs during the period for early adolescence. This is also a key period in which to stimulate continuing interest in science. However, early adolescence is also a period characterized by rapid change in biological, social, intellectual, and attitudinal characteristics. The RISE Program is especially interested in those studies that would focus on the learning and teaching of science and mathematics to early adolescents. Research which elaborates biological, social, intellectual, motivational, and instructional factors that may specifically influence learning of science and mathematics during adolescence is especially encouraged.

2. SCIENCE FOR WOMEN, MINORITIES, AND HANDICAPPED

No group should be exempted from the opportunity to learn science and mathematics and to participate in science-related careers. The RISE Program has a particular interest in coming to understand those psychological, social, economic, and intellectual factors that would facilitate more participation in science-related activities by women, minorities, and handicapped.

3. TECHNOLOGY IN SCIENCE EDUCATION

Costs of technologies that can make science and mathematics information and instruction widely available are dropping so rapidly that general use in the service of education is becoming increasingly feasible. There is a need for development of theory and research to guide us in making effective applications of these technologies to problems of science and mathematics education, such as that of continuing education of scientists and engineers.

4. SCIENCE LITERACY

We live in a world built on the findings of science. It is a world in which the nature and quality of life may rest in part on the ability of people to keep alive to the ideas of science; namely, to acquire and then maintain a useful, updated level of science enlightenment. RISE seeks research that has implications for science literacy. Research on science literacy questions may extend to out-of-school contexts for learning.

5. COGNITIVE PROCESSES AND THE STRUCTURE OF KNOWLEDGE

Research in this area is jointly funded under an interagency agreement between the National Institute of Education and the National Science Foundation. It is intended to increase our understanding of the relationship between learning processes and the nature and structure of scientific and mathematics knowledge. Investigators with this interest should request Guide for Proposal Preparation, SE 79-53, Research on Cognitive Processes and the Structure of Knowledge in Science and Mathematics.

Proposals directed at concerns other than these five areas may be submitted but they will need to be of substantially greater-than-ordinary interest or potential national value if they are to gain serious consideration.

II. PREPARATION OF FORMAL PROPOSALS

PROPOSAL FORMAT

To facilitate review, each proposal must contain the following elements:

Cover Page
Table of Contents
Project Summary
Narrative
Budget
Budget Explanation
Other Commitments of Senior Personnel
Appendices
(See Appendix E for checklist)

COVER PAGE (See Appendix A)

The cover page must be prepared in accordance with Appendix A and must specify one of the following two categories:

I. Research Evaluation and Synthesis
II. Empirical Research

TABLE OF CONTENTS

Prepare a table of contents to facilitate review and evaluation.

PROJECT SUMMARY (See Appendix B)

The summary is to be a clear and simple precis employing a minimum of technical terminology, and accurately describing the proposed project. It should be written so that a scientifically literate person can understand the use of Federal funds in support of the project. State the objectives of the proposed research and the basic elements of the research plan. As much detail as possible, typed single spaced, should be provided within the space limitations of the form.

NARRATIVE

The narrative must not exceed 30 double-spaced pages and should include:

1. Topic: Provide a statement and description of the topic addressed and a clear specification of the question or problem to be studied.

   Proposers are to present a case for the projected research in light of deficiencies in existing knowledge or in terms of contributions and significance to the research knowledge base. Include critical literature references and evidence of need. Where appropriate, cite past work in important and relevant areas.

2. Significance: Discuss how results of the work might eventually guide further research or lead to better practices in science education. Indicate significant public policy areas in science education that might be affected by the findings.

3. Plan: Describe the procedures to be followed in carrying out the project. Be specific, and state reasons for the procedures planned.

   Proposals in Category I go beyond a compilation and review of literature to include critical syntheses of research with a view to developing theory, improving practice, identifying promising lines of investigation and fruitful research questions. Proposals should describe a set of procedures for selecting the research to be evaluated and should append an illustrative bibliography. They should also state procedures for assessing both internal and external validity of the research reviewed and describe how the task of synthesizing the results of validated research will be accomplished.

   Category II proposals must include a detailed design for conducting the research proposed. Matters of sampling, statistical analysis, data availability, relevant previous research, theoretical basis, and the like must, when applicable, be discussed.

4. Schedule of Activities: Identify project starting date, termination dates and other significant progress points. Use milestone charts, or other graphic or verbal presentation techniques which clarify the research process and timetable.

5. Personnel Qualifications: Briefly describe the education and experience of the principal investigator and other staff and relate these qualifications to the proposed project activities. Indicate how the skill mix (scientists, science educators, and science education researchers) will help achieve project goals. Include vitae in an appendix.

6. Organization and Management Plan: Specify the proposed structure for operating the project and the responsibilities of key personnel.

7. Dissemination of Results: Proposals should describe plans for facilitating the utilization of the research results by interested and appropriate audiences.

BUDGET MATTERS (Appendix C)

The Foundation requires a Summary Proposal budget prepared in accordance with Appendix C. Sufficient travel funds should be included in proposal budgets to allow two visits to NSF for Foundation-sponsored meetings. Note that indirect costs should be calculated on the basis of the institution's research rate. The budget should have appended an explanation for each major item in the budget. The explanation should briefly state why an item is important and how the dollar value was estimated. The reviewer must be able to clearly and specifically relate each budget item to the activity it supports.

OTHER COMMITMENTS OF SENIOR PERSONNEL

Each proposal must list all current projects, in addition to the proposed project, to which the senior personnel have committed a portion of their time, whether or not salary for the person involved is included in the budgets of the various projects. This information should include the titles and dates of current grants or contracts, the source of funds, annual budget levels, and the man-months devoted to each project by each of the senior personnel. The proposal must also provide analogous information for *all* other proposed projects which are being considered by, or which will be submitted in the near future to, other possible sponsors including other Foundation programs. Concurrent submission of a proposal to other organizations will not prejudice its review by the Foundation.

Pursuant to a Congressional requirement, no individual shall be reimbursed as a direct cost under this award at a rate which exceeds the equivalent of $47,500 per annum unless specific prior written approval has been provided by NSF. The term "investigator" is interpreted in a broad context as meaning *any direct cost salary* paid to *anyone* involved in an NSF grant project in order to simplify administration and audits. Further, the salary ceiling requirement is intended to apply to those subcontracts under grants that require prior approval by the Foundation.

EQUIPMENT

If a proposal includes the purchase or lease of special-purpose equipment having a unit acquisition cost above $10,000, the authorized organizational representative must certify that the equipment (a) is essential and not reasonably available and accessible to the project and (b) if funded by NSF, will be subject to reasonable inventory controls, maintenance procedures, and organizational policies that will enhance its multiple or shared use on other projects, if the other use will not interfere with the work on the project for which the equipment is being acquired. Because of the lead time involved, it may not be practical for an institution to make this certification when it submits the proposal. In such cases, NSF will accept a statement to that effect in the proposal with the understanding that the certification will be supplied before a grant is made.

APPENDICES

Appendices may be used to provide background or supporting information. It should be kept in mind, however, that reviewers' time is limited and voluminous appendices may not be studied carefully.

III. SUBMISSION OF PROPOSALS

1. Ten (10) copies of the complete proposal are required.
2. Copy must be typed doublespaced on one side only of 8½" x 11" paper.
3. Pages are to be numbered at the bottom.
4. Proposal copies are to be assembled in the order shown above, and stapled in the upper left hand corner, but not otherwise bound.
5. The original, signed Cover Sheet is the letter of transmittal. Institutional letters of endorsement or transmittal supporting letter, institutional forms, etc., if included, must be appended to the proposal.
6. Proposals must be securely bound in a single package and either mailed to:

   Central Processing Section
   National Science Foundation
   Washington, D.C. 20550
   ATTN: Research in Science Education

   or hand-delivered to Room 223, NSF, 1800 G Street, N.W., Washington, D.C.
7. To facilitate prompt acknowledgement of the arrival of the package at the Foundation, the proposer should cut out two acknowledgement-of-receipt postcards from the back cover of this guide, fill them in to identify the proposal, address one card to the project director and the other to the official authorized to sign the Cover Page and attach them to the Signature Copy of the Cover Page. When the package arrives, the date of receipt and an assigned proposal number will be stamped on the card before it is returned, so that thereafter the proposer and the Foundation may refer to this proposal number in correspondence. If receipt is not acknowledged within 2 weeks of submission, the program office should be contacted promptly at 202/282-7745.

IV. PROPOSAL EVALUATION

METHOD OF SELECTION

All proposals will be screened initially by Foundation staff to insure that they meet basic conditions of program relevance, as well as format, style and other requirements. Proposals meeting these requirements will be evaluated by a peer review procedure. Reviewers will include persons in the appropriate science, science education and research communities, in professional groups, and in relevant Federal agencies. When appropriate, individuals representing the public may be included as reviewers. Sole responsibility for the final decision on each proposal rests with the National Science Foundation. When necessary, there will be negotiation between the Foundation and the proposer.

EVALUATION AND SELECTION CRITERIA

For categories I and II, the criteria listed below will receive approximately equal weight and the Foundation will select those proposals which, in its judgment, offer the greatest potential for improving science education.

1. Rationale for the Study
   a. Does the project address a question of scientific or policy importance in science education?
   b. Does the proposal offer convincing evidence that the question is important?
   c. Is the proposed work adequately grounded in theory? Will it significantly contribute to the further development of theory or knowledge relevant to science education?
   d. Is the proposed project appropriate for RISE support rather than some other public or private agency or NSF program?

2. Quality of the Plan
   a. Is the project feasible as described?

b. Does the proposal demonstrate knowledge and understanding of previous research efforts and their relation to the proposed project?
c. Are procedures adequately specified for each major part of the project? Are necessary data available? Are statistical and other analysis techniques appropriate and adequately specified?
d. Is the plan for dissemination of results appropriate?

3. Personnel Qualifications and Management Plan
   a. Do the project director, key staff and consultants have pertinent science and science education skills and relevant experience?
   b. Is the management procedure realistic and effective?
   c. Is the budget adequate to carry out the objectives of the study?

V. OTHER CONSIDERATIONS IN SUBMITTING PROPOSALS

ASSURANCE OF COMPLIANCE WITH CIVIL RIGHTS ACT

If the applicant institution has not filed an Assurance of Compliance with Title VI of the Civil Rights Act of 1964 as required by NSF regulations, pertinent forms and a copy of the regulations may be obtained by writing to the Foundation's Division of Grants and Contracts. The required Assurance Form, when completed by the institution, should be submitted to the Division of Grants and Contracts. Once an Assurance Form has been submitted by the applicant organization, it covers all proposals subsequently submitted by any department or other unit of that organization. Individual Assurance Forms are not necessary for each application or for each proposal. If there is some question as to whether an institution has filed an Assurance of Compliance, the institution's business office should be consulted.

GRANTEE ORGANIZATION AND MANAGEMENT DATA

If your organization has not received an NSF grant within the past 2 years, please fill out the Organization and Management Information card on the back of the brochure and mail it to the address indicated on the card.

HUMAN SUBJECTS

a. The protection of the rights and welfare of human subjects (including students) involved in research, development and related activities supported by NSF grants is the responsibility of the grantee.

b. The informed consent of the individual is a vital element in the protection of human subjects. Applicants are referred for guidance to CODE OF FEDERAL REGULATIONS, Title 45, Part 46, Protection of Human Subjects, Revised as of April 1, 1977, available from the Office for the Protection from Research Risks, National Institutes of Health.

c. Before a grant can be made, NSF must receive a statement that research involving use of human subjects has been reviewed and approved by the appropriate Institutional Review Board at the grantee organization, and that the grantee assures NSF that it will comply with DHEW policies, as amended, regarding the use of human subjects. This statement must be received prior to the final processing of an award.

PRE-COLLEGE STUDENTS AND EXPERIMENTAL CURRICULUM DEVELOPMENT PROJECTS

Grantees of projects which involve pre-college students in research or development on, or pilot-testing, evaluation or revision of, experimental or innovative curriculum development projects will:

a. Provide to the school board, or comparable authority responsible for the schools considering participation in the project, information concerning the need for and purposes of the particular education project, the proposed content of the material to be used, the expected benefits to be derived, and other information to assist the jurisdiction in arriving at a decision on participation.

b. Obtain, after the responsible authority has carried out its procedures, written approval for participation in the project activities.

c. Provide information and materials to the responsible school authority to assist it in carrying out its own established procedures regarding the participation of students in project activities.

d. Provide information to the Foundation describing compliance with the above provisions.

e. Provide, in accord with NSF FY 1976 House Authorization Legislation (Public Law 94-86), in every publication, testing or distribution agreement involving instructional material developed under a grant (including but not limited to teacher's manuals, textbooks, films, tapes or other supplementary material) that such material will be made available within the school district using such material for inspection by parents or guardians of children engaged in educational programs or projects of that school district.

ACCESS TO PEER REVIEW INFORMATION

After a final decision has been made, the Foundation will inform the proposer of the reasons for its decision on the proposal. Verbatim copies of reviews, not including the identity of the reviewer, will be provided to each respective applicant.

CONFIDENTIAL ASPECTS OF PROPOSALS AND AWARDS

When a proposal results in a grant, it becomes a part of the record of the Foundation's transactions, available to the public upon specific request. Information that the Foundation and the grantee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law; therefore, any information that the applicant wishes to have the Foundation consider as privileged should be clearly marked as such and sent in a separate statement, two copies of which should accompany the proposal.

A proposal that does not result in a grant may be retained by the Foundation. Such a proposal will be released only: 1) with the consent of the proposer; or 2) to the extent required by law. A proposal may be withdrawn at any time prior to final action thereon by the Foundation.

INDIRECT COSTS

Each proposal may include indirect costs at the rate approved for the institution. Proposals should specify the institution's approved rate and, if different, the rate requested for the proposed activities. The approved rate and the base for the computation may be obtained from the business officer of the institution. That person should contact the Foundation's Division of Grants and Contracts, Cost Analysis Section, Award and Administration Branch if the organization does not have an approved rate, or is a first-time applicant. If information is needed with regard to an approved rate, call 202/634-7545.

CONTRACTING OR TRANSFERRING THE PROJECT EFFORT

Excluding the purchase of commercially available supplies, materials, equipment, or general support services allowable under the grant, none of the research or substantive effort under an NSF grant may be contracted, or otherwise transferred to another organization without prior NSF approval. Normally, the intent to so contract is fully disclosed in the proposal submission, and evidence of NSF prior approval appears in the grant instrument. In the event the need arises to so contract after a grant has been made, the grantee must submit to the NSF Grants Officer the proposed performance statement and budget, a statement indicating the basis for selection of the contractor and a justification of the proposed arrangement. The request must be signed by the principal investigator/project director and endorsed by the Authorized Organizational Representative. NSF approval will be indicated by letter from the Grants Officer.

NSF EVALUATION OF PROGRAMS

Proposers should be aware that the Foundation may, as a part of its own program evaluation activities, carry out in-depth evaluations of selected awarded projects through independent third parties. Thus, proposers should be prepared to cooperate with evaluators eventually retained by the Foundation to analyze both the institutional context and the impact of any supported project.

VI. PROJECT AND AWARD MANAGEMENT

GRANT ADMINISTRATION

Grants will be administered in accordance with the terms and conditions of the award instrument.

An NSF grant is normally made to an organization, known as the grantee, rather than to the individual principal investigator or project director who proposed to conduct the project. Notification of an award is made by letter signed by the NSF grants officer. The grant establishes a relationship between NSF and the grantee in which:

- NSF agrees to provide financial support for the project to be performed under the provisions of the grant instrument.
- The grantee agrees to the performance of the project, to the prudent management of the funds provided by the grant and to the provisions of the grant instrument.

The grantee is free to accept or reject the grant. Normally, the action to obtain Federal funds constitutes acceptance of a grant once it is made. However, in some cases, NSF may require written acceptance.

All written inquiries of a programmatic or technical nature should be directed to the Research in Science Education Program, National Science Foundation, Washington, D.C. 20550. Inquiries about other matters should be directed to the Foundation's Division of Grants and Contracts at the same address.

Personal visits to the program staff may be made to Room W-648, 5225 Wisconsin Avenue, N.W., Washington, D.C. or telephone calls directed to 202/282-7745. (Correspondence should not be sent to the Wisconsin Avenue address.)

Incorporated into the grant letter is the approved budget and other grant conditions. The grant provides authority to the grantee to commit funds for support of the project at any time between the effective date of the grant and the expiration date of the grant.

The grant period extends from the effective date of the award through the expiration date and is that span of time during which the objectives of the project are to be achieved and the grant funds are available for appropriate obligation. This period intentionally is longer than the duration of the project in order to allow time for preparation of reports after the project is concluded. The grant becomes effective on the date specified in the grant letter and expires on the date given in that letter. It is required that all commitments of grant funds be made during the grant period.

CHANGES IN PROJECT OPERATION

Although major changes in the conduct of the project may be proposed at any time, changes in the scope, objectives, and professional personnel of the project must be approved in advance by the Foundation. Requests should be addressed to the cognizant program manager.

NO-COST EXTENSIONS

When circumstances delay the work, a no-cost extension may be requested. This request, along with a justification, must be received at the Foundation at least 45 days before the award expiration date, contain the signatures of both the project director and the authorized institutional representative, and include a summary of progress, a budget for use of the remaining funds, and plans to complete the project.

PUBLICATIONS

The Foundation provides grant and contract support for research and education in the sciences. The grantee or contractor is wholly responsible for the conduct of such research, publication of the results therefrom, and the preparation of curricular materials. The Foundation, therefore, does not assume responsibility for such findings or their interpretation or the content of such curricular materials. Nevertheless, the Foundation retains the right to approve the distribution of such materials.

ACKNOWLEDGEMENT AND DISCLAIMER

An acknowledgement of NSF support must be made in connection with the publication of any material based on or developed under a project supported by NSF to the effect that: "This (material) was prepared with the support of National Science Foundation Grant No. 00."

Any materials, books, monographs, proceedings of symposia, or similar publications supported by an NSF grant must contain a statement, immediately following the acknowledgement, that contains an expression of the following: "Any opinions, findings, conclusions or recommendations expressed (herein) are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."

PROJECT REPORTING REQUIREMENTS

Interim Reports—For grants having a duration of more than 1 year, interim reports should be submitted by the project director to the RISE program staff at the end of each academic year's activities, covering such matters as 1) progress to date in comparison with the project schedule; 2) results to date of the on-going monitoring evaluation process; 3) problems encountered and methods used in solving them; and 4) circumstances or considerations which might significantly affect subsequent phases of the project. Interim reports should not include requests for NSF approval for major changes. Such requests should in all cases be the subject of separate correspondence.

Final Project Report (See Appendix D, Form 98A, Parts I and II)

The Foundation's simplified grant reporting procedures are as follows: Two copies of the Final Project Report (NSF Form 98A) are to be submitted by the project director within 90 days after expiration of the award to:

National Science Foundation
Division of Grants and Contracts
Post-Award Projects Branch
Washington, D.C. 20550

The purpose of a final report is two-fold. It provides for the record a factual account of the project, and it also provides an opportunity for an assessment of the effectiveness of the activity and of the NSF program through which the project was supported. The grantee should bear in mind that the Final Project Report may be used, together with the project abstract prepared at the time of the award, to answer inquiries by nonscientists as to the nature and signficance of projects which the Foundation supports. The report should be written in such a way that its scientific contribution will be clear to readers whose work may be in different areas.

Final Technical Description of Project and Results (Form 98A, Part III)

In addition to the Final Project Report (NSF Form 98A, Parts I and II), a minimum of two copies of the Final Technical Report is required (Form 98A, Part IIIe). While there is no standard form for the technical report, it should contain a one-page summary or abstract, an index, a narrative account of the project, and rationale, methods, and results obtained. The technical information, Part III of Form 98A, should be submitted directly to the RISE program manager within 90 days after the expiration of the award. It should be typed on standard size (8" x 10½" or 8½" x 11") paper, unbound, but stapled in the upper left hand corner.

Substantive technical reports that describe research results, knowledge, or information of general utility and interest that will not appear in the periodical literature or be publishned by professional, commercial or other organizations should be submitted to both the National Technical Information Service (NTIS) and the Educational Resources Information Center (ERIC).

All technical reports submitted to NTIS should contain a completed ANSI Report Documentation Page (NTIS Form 35) and should be accompanied by one or more Accession Notice Cards which should be addressed to the NSF Program Officer monitoring your project so that the program will have confirmation that the report was submitted and the NTIS Acquisition Number Technical Reports should be sent to:

Input Branch
National Technical Information
Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

In order to submit reports to ERIC, two copies should be sent to:

Educational Resources
Information Center (ERIC)
Processing and Reference Facility
4833 Rugby Avenue
Suite 303
Bethesda, Maryland 20014

FINAL EXPENDITURE INFORMATION

Final expenditure information, also required for each completed grant, is provided through the quarterly Federal Cash Transactions Report (FCTR, formerly known as the Quarterly Expenditures Report). The Foundation's computerized version of FCTR is forwarded to the fiscal officer of each grantee institution by the Foundation's Division of Financial and Administrative Management (DFA) in the month following the close of each calendar quarter. Procedures for reporting are sent to grantees at the time an award is made. Completed Federal Cash Transactions Reports are returned to:

Division of Financial and
Administrative Management
National Science Foundation
Washington, D.C. 20550

APPENDIX A

BEST DOCUMENT AVAILABLE

PROPOSAL TO THE NATIONAL SCIENCE FOUNDATION

DIRECTORATE FOR SCIENCE EDUCATION

Cover Page

FOR CONSIDERATION BY NSF ORGANIZATIONAL UNIT (please specify) RESEARCH IN SCIENCE EDUCATION	IS THIS PROPOSAL BEING SUBMITTED ELSEWHERE IN NSF OR TO ANOTHER FEDERAL AGENCY? Yes ______ No ______ IF YES, EXPLAIN ON ATTACHED SHEET.
PROGRAM ANNOUNCEMENT/SOLICITATION NO.: SE 79-55D	CLOSING DATE (IF ANY):

NAME OF SUBMITTING ORGANIZATION TO WHICH AWARD SHOULD BE MADE (INCLUDE BRANCH/CAMPUS/OTHER COMPONENTS)

ADDRESS OF ORGANIZATION (INCLUDE ZIP CODE)

TITLE OF PROPOSED PROJECT

TOTAL REQUESTED FROM NSF: $	PERIOD OF PROJECT OPERATION: Starting Date: Ending Date:
(DIRECTOR'S NAME AND SOCIAL SECURITY NO. (SSN)* (Dr., Prof., Mr., Ms.)	PI/PD PHONE NO. Area Code: Home: Office:
PI/PD DEPARTMENT	PI/PD ORGANIZATION

Characteristics of the study: Category I II (Circle one)

Target population ______________________________

Subject matter to be studies ______________________________

Areas of emphasis (check more than one if appropriate)

___/ Early adolescence
___/ Technology
___/ Women
___/ Minorities
___/ Handicapped
___/ Science Literacy
___/ Continuing Education
___/ Other

*Submission of social security numbers is voluntary and will not affect the organization's eligibility for an award. However, they are an integral part of the NSF information system and assist in processing the proposal. SSN solicited under NSF Act of 1950, as amended.

PRINCIPAL INVESTIGATOR/ PROJECT DIRECTOR	AUTHORIZED ORGANIZATIONAL REP.	OTHER ENDORSEMENT (optional)
NAME (Dr., Prof., Mr., Ms.)	NAME (Dr., Prof., Mr., Ms.)	NAME (Dr., Prof., Mr., Ms.)
SIGNATURE	SIGNATURE	SIGNATURE
TITLE	TITLE	TITLE
DATE	DATE	DATE

APPENDIX B **BEST DOCUMENT AVAILABLE**

EXHIBIT II-B

NOTICE OF RESEARCH PROJECT
SCIENCE INFORMATION EXCHANGE

SMITHSONIAN INSTITUTION

NATIONAL SCIENCE FOUNDATION
PROJECT SUMMARY

PROJECT NO. (Do not use this space)
NSF AWARD NO.

1. NAME OF INSTITUTION (INCLUDE BRANCH/CAMPUS & SCHOOL OR DIVISION)
2. MAILING ADDRESS
3. PRINCIPAL INVESTIGATOR AND FIELD OF SCIENCE/SPECIALTY
4. TITLE OF PROJECT
5. SUMMARY OF PROPOSED WORK (LIMIT TO 22 PICA OR 18 ELITE TYPEWRITTEN LINES)

FOR NSF USE ONLY

DIVISION (OFFICE) AND DIRECTORATE SCIENCE EDUCATION DEVELOPMENT & RESEARCH	PROGRAM Research in Science Education	
SECTION	PROPOSAL NO.	F.Y.

FOR OGC USE ONLY

START AND END DATES	AMOUNT GRANTED

NSF FORM 4 (7-78)
1. Proposal Folder
2. Program Suspense
3. Division of Grants & Contracts
4. Science Information Exchange
5. Principal Investigator
6. Off. of Govt. & Pub. Progs.
7. Assistant Director

APPENDIX C

SUMMARY
PROPOSAL BUDGET

FOR NSF USE ONLY	
PROPOSAL NO.	
DURATION (MONTHS)	
PROPOSED	REVISED

ORGANIZATION AND ADDRESS

PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR

NSF USE	A. SENIOR PERSONNEL (LIST BY NAME; SHOW NUMBERS OF PEOPLE IN BRACKETS; SALARY AMOUNTS MAY BE LISTED ON SEPARATE SCHEDULE) GPM 205.1b	NSF FUNDED MAN MONTHS			FUNDS REQUESTED BY PROPOSER	FUNDS GRANTED BY NSF (IF DIFFERENT)
		CAL.	ACAD.	SUMR.		
	1. P.I./P.D.				$	$
	2. CO P.I./P.D.				$	$
	3. CO P.I./P.D.				$	$
	4. CO P.I./P.D.				$	$
	5. CO P.I./P.D.				$	$
11115	6. ( ) ← SUBTOTALS A1 - A5 →				$	$
	FACULTY AND OTHER SENIOR ASSOCIATES (ATTACH EXTRA SHEET IF NECESSARY)					
	7.				$	$
	8.				$	$
	9.				$	$
	10.				$	$
	11.				$	$
11117	12. ( ) ← SUBTOTALS A7 - A11 →				$	$
	B. OTHER PERSONNEL (LIST NUMBERS IN BRACKETS)					
11141	1. ( ) POSTDOCTORAL ASSOCIATES				$	$
11149	2. ( ) OTHER PROFESSIONALS				$	$
11150	3. ( ) GRADUATE STUDENTS				$	$
11152	4. ( ) UNDERGRADUATE STUDENTS				$	$
11182	5. ( ) SECRETARIAL - CLERICAL				$	$
11183	6. ( ) TECHNICAL, SHOP, OTHER				$	$
	TOTAL SALARIES AND WAGES (A+B)				$	$
11200	**C. FRINGE BENEFITS** (IF CHARGED AS DIRECT COSTS)				$	$
	TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)				$	$
	D. EQUIPMENT (LIST ITEMS AND DOLLAR AMOUNTS FOR EACH ITEM)					
23181	TOTAL EQUIPMENT				$	$
	E. MATERIALS AND SUPPLIES					
32630					$	$
	F. DOMESTIC TRAVEL					
42111					$	$
	G. FOREIGN TRAVEL (LIST DESTINATION AND AMOUNT FOR EACH TRIP; GPM 731)					
42112					$	$

PAGE 1 OF 2 PAGES

BEST DOCUMENT AVAILABLE

BEST DOCUMENT AVAILABLE

SUMMARY PROPOSAL BUDGET

PROPOSAL NO.

52500	**H. PUBLICATION COSTS/PAGE CHARGES**	$	$
62315	**I. COMPUTER (ADPE) SERVICES**	$	$
	J. CONSULTANT SERVICES (IDENTIFY CONSULTANTS BY NAME AND AMOUNT; GPM 516)	▨	▨
		$	$
	K. PARTICIPANT SUPPORT COSTS, IF ALLOWED BY PROGRAM GUIDE (ITEMIZE) GPM 518	▨	▨
	1. STIPENDS $ ______	▨	▨
	2. TRAVEL $ ______	▨	▨
	3. SUBSISTENCE $ ______	▨	▨
	4. OTHER - SPECIFY $ ______	▨	▨
	5. TOTAL PARTICIPANT COSTS (K1 + K2 + K3 + K4)	$	$
	L. ALL OTHER DIRECT COSTS (List items and dollar amounts. Details of subcontracts, including work statements and budget, should be explained in full in proposal.)	▨	▨
	$ ______	▨	▨
	$ ______	▨	▨
	$ ______	▨	▨
	$ ______	▨	▨
65001	TOTAL OTHER DIRECT COSTS	$	$
	M. TOTAL DIRECT COSTS (A THROUGH L)	$	$
	N. INDIRECT COSTS (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks.)	▨	▨
74100	TOTAL INDIRECT COSTS	$	$
	O. TOTAL DIRECT AND INDIRECT COSTS (M + N)	$	$
74500	**P. LESS RESIDUAL FUNDS** (If for further support of current project; GPM 252 and 253)	$	$
75000	**Q. AMOUNT OF THIS REQUEST** (O MINUS P)	$	$

REMARKS

NOTE: SIGNATURES REQUIRED ONLY FOR REVISED BUDGET (GPM 233). THIS IS REVISION NO.

SIGNATURE OF PRINCIPAL INVESTIGATOR/PROJECT DIRECTOR	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE
SIGNATURE OF AUTHORIZED ORGANIZATIONAL REPRESENTATIVE	DATE OF SIGNATURE	TYPED OR PRINTED NAME AND TITLE

FOR NSF USE ONLY

INDIRECT COST RATE VERIFICATION			PROGRAM OFFICER APPROVAL
Date Checked	Date of Rate Sheet	Signature	

Grant Number	Amend No.	Institution	Organization	Fund Acct.	Program	Object	

	Proposal Number	Dur.	Chg.	Award Date	Proposed Amount	Prpsd. Dur.	

PAGE 2 OF 2 PAGES

APPENDIX D

NATIONAL SCIENCE FOUNDATION **Washington, D.C. 20550**	**FINAL PROJECT REPORT** **NSF FORM 98A**

PLEASE READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING

PART I—PROJECT IDENTIFICATION INFORMATION

1. Institution and Address	2. NSF Program	3. NSF Award Number
	4. Award Period From To	5. Cumulative Award Amount
6. Project Title		

PART II—SUMMARY OF COMPLETED PROJECT *(FOR PUBLIC USE)*

PART III—TECHNICAL INFORMATION *(FOR PROGRAM MANAGEMENT USES)*

1. ITEM *(Check appropriate blocks)*	NONE	ATTACHED	PREVIOUSLY FURNISHED	TO BE FURNISHED SEPARATELY TO PROGRAM	
				Check (√)	Approx. Date
a. Abstracts of Theses					
b. Publication Citations					
c. Data on Scientific Collaborators					
d. Information on Inventions					
e. Technical Description of Project and Results	▨				
f. Other *(specify)*	▨				

2. Principal Investigator/Project Director Name *(Typed)*	3. Principal Investigator/Project Director Signature	4. Date

NSF Form 98A (5-78) Supersedes All Previous Editions

Form Approved OMB No. 99R0013

BEST DOCUMENT AVAILABLE

INSTRUCTIONS FOR FINAL PROJECT REPORT
(NSF FORM 98A)

This report is due within 90 days after the expiration of the award. It should be submitted in two copies to:

National Science Foundation
Division of Grants and Contracts
Post-Award Projects Branch
1800 G Street, N.W.
Washington, D.C. 20550

INSTRUCTIONS FOR PART I

These identifying data items should be the same as on the award documents.

INSTRUCTIONS FOR PART II

The summary (about 200 words) must be self-contained and intelligible to a scientifically literate reader. Without restating the project title, it should begin with a topic sentence stating the project's major thesis. The summary should include, if pertinent to the project being described, the following items:

- The primary objectives and scope of the project.
- The techniques or approaches used only to the degree necessary for comprehension.
- The findings and implications stated as concisely and informatively as possible.

This summary will be published in an annual NSF report. Authors should also be aware that the summary may be used to answer inquiries by nonscientists as to the nature and significance of the research. Scientific jargon and abbreviations should be avoided.

INSTRUCTIONS FOR PART III

Items in Part III may, but need not, be submitted with this Final Project Report. Place a check mark in the appropriate block next to each item to indicate the status of your submission.

a. Self-explanatory.
b. For publications (published and planned) include title, journal or other reference, date, and authors. Provide two copies of any reprints as they become available.
c. Scientific Collaborators: provide a list of co-investigators, research assistants and others associated with the project. Include title or status, e.g. associate professor, graduate student, etc.
d. Briefly describe any inventions which resulted from the project and the status of pending patent applications, if any.
e. Provide a technical summary of the activities and results. The information supplied in proposals for further support, updated as necessary, may be used to fulfill this requirement.
f. Include any additional material, either specifically required in the award instrument (e.g. special technical reports or products such as films, books, studies) or which you consider would be useful to the Foundation.

APPENDIX E

Check List for Proposal Submission

Complete proposals help to expedite the review process and assist the applicant in meeting program requirements. The following check list is provided as an aid to assuring proposal completeness.

__/ Cover page (all items completed on requested format, Appendix A)

__/ Table of Contents

__/ All required signatures (project director and authorizing official)

__/ Project Summary (use requested format, see Appendix B)

__/ Narrative (double spaced, 30 pages maximum numbered at bottom)

__/ Budget (see Appendix C)

__/ Research rate for indirect costs

__/ Other commitments of senior personnel

__/ Vitae of senior personnel

__/ Ten copies of proposal

__/ Review for protection of human subjects

__/ Equipment certification if any item exceeds $10,000

__/ Written approval from responsible authority for pre-college students participation in project activities

__/ Complete acknowledgement cards (back cover)

APPENDIX F

RESEARCH IN SCIENCE EDUCATION
Information for Preparation of Preliminary Proposals

I. INTRODUCTION

Scientific knowledge changes as well as the contexts in which it is taught. These changes have implications for public issues, technology and individual decisionmaking. The processes by which people, young and old, both professionals and nonprofessionals, may be helped to acquire what they need to know are not well understood. Furthermore, in a society such as we have become, the vigor of science and technology is central to the health of the economy. In turn, the scientific and technological enterprise is dependent upon the quality and vitality of science and mathematics education. The Research in Science Education (RISE) Program seeks to assist in creating and organizing a body of fundamental knowledge that can be used to improve the quality and effectiveness of science education for a wide spectrum of consumers. For this reason the RISE Program of the National Science Foundation provides support for research that might ultimately lead to the improvement of the quality of science and mathematics education. The focus of RISE this year will fall primarily in five areas of current concern.

1. SCIENCE EDUCATION FOR THE EARLY ADOLESCENT

For many students the last opportunity to learn science in school occurs during the period of early adolescence. This is also a key period in which to stimulate continuing interest in science. However, early adolescence is also a period characterized by rapid change in biological, social, intellectual, and attitudinal characteristics. The RISE Program is especially interested in those studies that would focus on the learning and teaching of science and mathematics to early adolescents. Research which elaborates biological, social, intellectual, motivational, and instructional factors that may specifically influence learning of science and mathematics during adolescence is especially encouraged.

2. SCIENCE FOR WOMEN, MINORITIES, AND HANDICAPPED

No group should be exempted from the opportunity to learn science and mathematics and to participate in science-related careers. The RISE Program has a particular interest in coming to understand those psychological, social, economic, and intellectual factors that would facilitate more participation in science-related activities by women, minorities, and handicapped.

3. TECHNOLOGY IN SCIENCE EDUCATION

Costs of technologies that can make science and mathematics information and instruction widely available are dropping so rapidly that general use in the service of education is becoming increasingly feasible. There is a need for development of theory and research to guide us in making effective applications of these technologies to problems of science and mathematics education, such as that of continuing education of scientists and engineers.

4. SCIENCE LITERACY

We live in a world built on the findings of science. It is a world in which the nature and quality of life may rest in part on the ability of people to keep alive to the ideas of science; namely, to acquire and then maintain a useful, updated level of science enlightenment. RISE seeks research that has implications for science literacy. Research on science literacy questions may extend to out-of-school contexts for learning.

5. COGNITIVE PROCESSES AND THE STRUCTURE OF KNOWLEDGE

Research in this area is funded under separate guidelines. It is intended to increase our understanding of the relationship between learning processes and the nature and structure of scientific and mathematics knowledge. Investigators with this interest should request

Guide for Proposal Preparation, SE 79-53, Joint NIE-NSF Research Program.

Proposals directed at concerns other than these five areas may be submitted but they will need to be of substantially greater-than-ordinary interest or potential national value if they are to gain serious consideration.

Eligible Projects

Topics of investigation should be relevant to science and/or mathematics education. Investigators should keep in mind the five areas of research emphases already described. Activities such as curriculum or test development, program operation, or dissemination are *not* eligible for support in RISE unless they are clearly necessary in order to conduct research which fits RISE purposes. If in doubt about eligibility, write or call. (See III. below.) For proposals dealing primarily with development, such as projects for the development of instructional materials or methods, refer either to the Development in Science Education Program (SE 79-50) or to the Local Course Improvement Program (SE 79-34). For a complete listing of Science Education programs, see SE 79-1.

In summary, to be eligible for support from the RISE Program:

- Proposals for research must demonstrate close, direct, and realistic ties to science education or to education in the sciences. Eligible projects may deal with the physical, biological and social sciences, mathematics, engineering, technology, the history and philosophy of science, or may involve combinations of these disciplines. The practice aspects of technical, clinical, health, social, or business fields are excluded. Examples of topics outside the program are medicine, nursing, clinical psychology, social work, and business administration. However, the science education aspects of these disciplines are eligible.

  Proposals should be aimed at developing fundamental and generalizable knowledge; the research should focus upon issues of national importance, or of fundamental significance to science education research; studies that focus solely on problems of local concern are not eligible.

II. AWARD CATEGORIES

Within the emphases described above, proposals should be directed to one of two categories described below.

Category I. Research Evaluation and Synthesis

These studies are to provide comprehensive syntheses of already existing research that may have implications for science education. Cognate disciplines that have implications for science education may also be included. Proposals in Category I go beyond a compilation and review of literature to include critical syntheses of research with a view to developing theory, improving practice, identifying promising lines of investigation and fruitful research questions. As a result of the syntheses of research, projects in this category normally would also identify areas of needed research.

Category II. Empirical Research

This category supports a limited number of promising empirical research projects. The main body of the proposal should contain a detailed statement of the work to be undertaken and should include: objectives, rationale, and expected significance; relation of the proposed investigation to the present state of knowledge in the field, to previous work done, and to related work in progress elsewhere. The statement should outline the general plan of work, including the broad design of experiments to be undertaken and an adequate description of methods and procedures.

A narrow conception of "research" may conjure up images of data collection and analyses that are too limited to cope with the task of creating knowledge that may be important for science education. Many problems in science education may require development of new research methods or may justify the use of nonquantitative or nonexperimental research techniques. In fact, for some priority research areas, the development of research methods and instruments is at least as important as the collection of more information using current techniques. Of course, if new methods are proposed, a convincing case should be made for their use and they should be clearly described.

An interdisciplinary approach to many of the research problems submitted to RISE is expected because the problems to be investigated are so complex.

Size and Duration of Projects

The nature of the research to be pursued and the methodology to be employed should provide a justification for the budget. Past projects have ranged from $21,000 to $228,000 and from 12 to 36 months. Proposers should realize that especially compelling arguments are required for support in excess of $200,000 or 36 months.

III. PREPARATION OF PROPOSALS

Normally proposals go through two stages of development and review.

Preliminary Proposals

Prospective applicants normally find it advisable to submit a proposal in preliminary form as a basis for discussion before a formal request is prepared. These may be submitted at any time. Such a preliminary proposal enables the staff to determine whether the proposed project has relevance to the Foundation's goals. New as well as experienced researchers are welcome to submit preliminary proposals. A preliminary proposal is treated as an informal document involving no commitment on the part of either the applying organization or the Foundation.

Preliminary proposals will be reviewed by Foundation staff and, where appropriate, by individuals outside the Foundation who are competent in the areas covered in the proposals. However, the proposal should be written in a way that makes its scientific contribution clear to all reviewers, including those whose own research may be in different areas.

While the preliminary proposal ought to be brief (not to exceed 10 double spaced typewritten pages altogether), it should adequately describe a significant problem. It should state as concisely as possible the essential conceptual and methodological features of the proposed project. The personnel to be involved should be listed and the qualifications that particularly suit them for this project should be stated. A brief budget summary must be included. Five copies of the preliminary proposal and two extra copies of the cover sheet, securely wrapped into a single package, should be sent to:

Research in Science Education
Division of Science Education
Development and Research
National Science Foundation
Washington, D.C. 20550

Preliminary proposals should *not* be sent to NSF's Central Processing Section.

Schedule

There are no fixed deadlines for the submission of preliminary proposals. Investigators who hope to start their projects during the summer or fall of 1979 are urged to submit their proposals as soon as possible, preferably not later than March 1979. Although visitors are welcome, time is usually better used if information is provided to the NSF program office about a proposed project before a prospective applicant makes a visit. The NSF program office is located in Room 648, 5225 Wisconsin Avenue, N.W., Washington, D.C. Telephone calls may be placed to the staff at 202/282-7745. Regular hours are 8:30 a.m. to 5:00 p.m. Monday through Friday.

Formal Proposals

Formal proposals are expected to follow preliminary proposals for those applicants who choose to proceed to this stage. Formal proposals generally require at least five months after receipt by NSF before a final decision is reached. These time periods should be kept in mind when planning a projected starting date. Instructions for the preparation of formal proposals may be obtained by writing to the address provided under the section on preliminary proposals and requesting GUIDELINES FOR PREPARATION OF FORMAL PROPOSALS, RESEARCH IN SCIENCE EDUCATION (SE 79-55F).

COVER SHEET
FOR
PRELIMINARY PROPOSALS
RESEARCH IN SCIENCE EDUCATION

1. Proposed Project Director's Name ______________________________
(One only)

Institution: ______________________________

Department: ______________________________

City ____________ State ____________ Zip Code ________

Telephone (include area code): Office ____________ Home ____________

2. Descriptive title of project (maximum: 12 words): ______________________________

____

Abstract:

3. Characteristics of the study: Category I II (Circle one)

Target population ______________________________

Subject matter to be studied ______________________________

Areas of emphasis (check more than one if appropriate)

___/ Early adolescence
___/ Technology
___/ Women
___/ Minorities

___/ Handicapped
___/ Science Literacy
___/ Continuing Education
___/ Other

4. Proposed starting date of project: ____________ Proposed duration of project: ______
(months)

5. Total support requested from NSF: $____________

6. ______________________________ ______________________________
Signature of Proposed Project Director Date of Submission

ADDRESS TO:

MPE/BBS/SE Branch
Division of Grants and Contracts
National Science Foundation
Washington, D.C. 20550

APPLICANT MANAGEMENT AND ORGANIZATION CARD

TO BE FILLED OUT BY THE NATIONAL SCIENCE FOUNDATION

Date Recieved ____________________ Proposal Number ____________

TO BE FILLED OUT BY THE PROPOSER

Name of Institution ______________________________

Name of Project Director ______________________________

Name of Director of
Sponsored Programs (or equivalent) ______________________________

Telephone Number ______________________________

Note: To be completed only if the proposing organization has not received an NSF grant within the previous two years.

Proposal Acknowledgment
Cards

(To be filled out by
proposing institution)

Address this card to
Institution's Business
Office

DATE:
SUBMITTED BY:
PROPOSAL I.D. NO.:
PROPOSAL TITLE:

The National Science Foundation acknowledges receipt of a proposal from the above applicant which has been assigned the proposal number indicated. Please use this number in all future correspondence.

A separate acknowledgment is being sent to the individual named above.

Central Processing Section
Division of Information Systems

F.L. 23 (5-78)

Address this card to
proposed Project
Director/Principal
Investigator

DATE:
PROPOSAL I.D. NO.:
PROPOSAL TITLE:

Your proposal has been received by NSF and has been assigned to this program for evaluation. Please refer to the above number in all future correspondence.

Consideration of proposals requires about five to nine months. If more time is needed, you will be notified. After a decision has been made by NSF on a proposal, anonymous verbatim copies of reviewers' comments are available to the principal investigator upon request.

A separate acknowledgment is being sent to your institution's business office. If you have any questions about the status of your proposal, please contact us.

RESEARCH IN SCIENCE EDUCATION
NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550

F.L. 24 (5-78)